THE ABANDONED MINE LANDS UNIT (AMLU)

FREQUENTLY ASKED QUESTIONS

The following are responses to frequently asked questions (FAQs) received by staff of the Department of Conservation's Abandoned Mine Lands Unit (AMLU). Please e-mail us at OMR@conservation.ca.gov, if you have other abandoned mine-related questions. While we attempt to respond to questions within one to two working days, not all questions and answers will be posted on this web page.

1. What should I do in an emergency involving an abandoned mine?

Call 911 or contact your local sheriff's office. If someone is injured due to a fall or is trapped in an abandoned mine, do not try to rescue the victim yourself. Rescue attempts should only be made by professionals with proper training and equipment to avoid further injury to the victim or yourself.

2. How do I report an abandoned mine other than in an emergency situation?

The AMLU has a toll-free phone number (**877-OLD-MINE**) for reporting abandoned mines in California. The AMLU can perform field visits to reported sites, depending on resource constraints and other obligations at the time the report is made to the AMLU. For more information, see the FAQ response to question number 9.

3. What is an abandoned mine?

While the circumstances for each mine are unique, an abandoned mine, generally speaking, has all of the following characteristics:

1. Mining operations have ceased for at least two years.
2. There is no current plan to reclaim the mine or interim plan to manage the mine during any period of non-activity.
3. There are no approved financial assurances to reclaim the mine and there is no responsible mining operator with the financial ability to reclaim the mine.

4. How many abandoned mines are there in California?

The AMLU estimates that more than 165,000 mine *features** on more than 47,000 abandoned mine sites exist statewide, of which an estimated 67% are located on federal lands, 2% are on state or local lands, and 31% are on private lands.

5. Are abandoned mines dangerous?

Yes! Every year, people are injured or killed in accidents on abandoned mine lands (AML) in California, which is why the AMLU's motto is "**Stay Out! Stay Alive!**" This message is part of the U.S. Mine Safety and Health Administration's (MSHA) national campaign to warn the public about dangers associated with abandoned mines (see the MSHA website at www.msha.gov/sosa/SOSAhome.asp).

Many mines in California that are now abandoned date back to the Gold Rush, were temporary by their nature, and can be an irresistible, and sometimes deadly, draw

* Italicized words or terms are defined in a glossary at the end of this document.

for children and adults. For the explorer, hiker, off-roader, or rockhound, abandoned mine hazards are not always apparent. Reasons why abandoned mines are dangerous include, but are not limited to, the following.

- Because removing rock weakens structural integrity, miners compensated by adding support inside mines as needed and by accepting any dangers involved in working in a mine. Horizontal abandoned mine openings may seem sturdy, but rotting timbers and unstable rock formations make cave-ins a real danger.
- Vertical shafts can be hundreds of feet deep. At the surface, they may be completely unprotected, hidden by vegetation, or covered by rotting boards.
- Internal working such as *winzes*, *drifts*, and *stopes* may present falling hazards. Darkness and debris add to the hazards and can disorient visitors, leaving them lost underground.
- Blasting caps or dynamite left behind can be extremely unstable and may detonate at any time.
- Visitors to an abandoned mine may encounter pockets of oxygen-depleted air or lethal gas (such as carbon monoxide) that can cause asphyxiation.
- Dust particles originating from abandoned mine sites may cause health problems due to naturally-occurring elements such as asbestos, arsenic, or chromium, or diseases such as hantavirus or valley fever.
- Abandoned mines are often used as habitat by wildlife, including rattlesnakes.
- Chemical and environmental hazards created by mines can pose health threats to visitors, the public at large, and wildlife. Water in a mine can react with sulfide-bearing rock to produce acid-generating conditions. This acid-bearing water is capable of leaching *heavy metals* from rock, creating *acid rock drainage (ARD)* or *acid mine drainage (AMD)*. Visitors can also be exposed to high levels of toxic waste left over from the processing of ore.

The California Department of Toxic Substances Control (DTSC) report Abandoned Mine Lands Preliminary Assessment Handbook (first published in 1998 and online at www.dtsc.ca.gov/SiteCleanup/Brownfields/upload/aml_handbook.pdf) discusses physical and chemical hazards that may be present at an abandoned mine site and contains information on chemical sampling strategies, methods, and analyses. According to the DTSC, the purpose of this guidance document is to: (1) provide non-technical information explaining the concerns associated with AML sites to AML property owners, developers whose projects may be on or adjacent to AML sites, and local planners who make land use decisions; and (2) provide technical information for environmental consultants, local environmental health officials, and other state and federal agencies who must evaluate California AML sites.

6. What State laws apply to property owners that have abandoned mines on their property?

Since laws and regulations can change at any time, we recommend you check with an expert (the information provided below is not meant to be legal advice). Our research shows that several State laws or regulations that address abandoned excavations may be applicable, such as the following Government Code (GC) and California Health and Safety Code (H&SC) sections.

- **GC § 50230(d)**. *As used in this article: ... (d) "Abandoned excavation" means any abandoned mining shaft, pit, well, septic tank, cesspool, or other abandoned excavation dangerous to persons legally on the premises where the abandoned excavation is located or to minors under the age of 12 years; and any facilities or equipment used in connection with drilling oil, mining or exploring for minerals or diatomaceous soil which have been abandoned and which constitute a hazard endangering the safety and welfare of the people.*
- **GC § 50231**. *The legislative body may declare by resolution as public nuisances and abate all abandoned excavations located upon private property within the local agency. The resolution shall contain a statement of the facts which constitute the nuisance*
- **H&SC § 115700(a)**. *Every person owning land in fee simple or in possession thereof under lease or contract of sale who knowingly permits the existence on the premises of any abandoned mining shaft, pit, well, septic tank, cesspool, or other abandoned excavation dangerous to persons legally on the premises, or to minors under the age of 12 years, who fails to cover, fill, or fence securely that dangerous abandoned excavation and keep it so protected, is guilty of a misdemeanor.*
- **H&SC § 115705**. *The board of supervisors may order securely covered, filled, or fenced abandoned mining excavations on unoccupied public lands in the county.*
- **H&SC § 115710**. *The board of supervisors shall order securely fenced, filled, or covered any abandoned mining shaft, pit, or other excavation on unoccupied land in the county whenever it appears to them, by proof submitted, that the excavation is dangerous or unsafe to man or beast. The cost of covering, filling, or fencing is a county charge.*
- **H&SC § 115715**. *Every person who maliciously removes or destroys any covering or fencing placed around, or removes any fill placed in, any shaft, pit, or other excavation, as provided in this part, is guilty of a misdemeanor.*
- Note that **H&SC § 115720** may limit the applicability of the above H&SC sections to any abandoned mining shaft, pit, or other abandoned excavation that contains a surface area of not more than ½-acre.

7. **Must a property owner inform a potential buyer about the presence of an abandoned mine on or adjacent to the property?**

   Generally speaking, California law requires sellers of real property to disclose important or "material" facts that may affect the property's value or desirability. This includes the disclosure of certain "natural" environmental hazards related to flood zones, seismic and earthquake hazard zones, etc. Buyers or seliers of real property should discuss their rights and responsibilities with their real estate agent and may want to contact a real estate law attorney to determine if the presence of an abandoned mine on or adjacent to the property must be disclosed. You may also be able to obtain general information related to certain environmental hazards from your realtor, local planning department, or other sources. For example, the informational booklet entitled Environmental Hazards: A Guide for Homeowners, Buyers, Landlords, and Tenants (2005) contains information on environmental hazards related to many substances, including naturally-occurring minerals such as asbestos that have been mined for various purposes.

8. **The Disclosure Statement for a property that I am considering buying states that "the subject property is located within 1 mile of an abandoned mining operation." What should I do?**

   If you are considering purchasing real property, you should review any information you receive from the seller or the seller's agents with your real estate agent as to what effect this information may have on the value or desirability of the property. You should also consider speaking to a qualified real estate attorney where appropriate. The accuracy of the seller's information depends greatly on its source and its interpretation, so you should ask the seller where they obtained the information, how was it interpreted, and what was the source of any database used to generate such a determination. Many old and abandoned mines are not recorded in electronic databases, and when they are, the information may not be detailed enough to accurately define, differentiate or locate the mine *feature*, such as a potentially hazardous vertical *shaft* or horizontal *adit* or *mine waste*.

9. **I was informed that my property, which lies in an area that contains many abandoned mines, may be a *hazardous waste property* or a *border zone property*. Whom do I contact to find out what this might mean to me?**

   Contact your local planning or environmental health department or the Department of Toxic Substances Control (DTSC) for information. According to the DTSC, the intent of California's Hazardous Waste and Border Zone statutes is as follows.

   - Hazardous Waste Property: to prevent exposure to substances that could create a significant health hazard by requiring DTSC approval for changes in land use on sites contaminated with hazardous waste.
   - Border Zone Property: to prevent new incompatible land uses proximate to a site contaminated with hazardous waste where there is a potential for exposure to hazardous substances that could create a significant health hazard.

10. How can I ...

- **Find out if an abandoned mine is on my property?**
- **Find historical information on a mining claim or named mine?**
- **Learn what was mined on a particular site?**

When abandoned mine *features* are not obvious, a thorough inspection of a property site by a qualified person is the only way to assess if an abandoned mine is present. Many mine sites were undocumented and unmapped, leaving open the possibility that an unrecorded abandoned mine may be located on a property. If you are concerned that hidden surface or underground workings might be present on or beneath your property, a qualified geologist, geophysicist, or geotechnical engineer should be consulted about detection methods. Methods to search for underground mines may include drilling, or remote sensing or geophysical methods such as ground-penetrating radar, electrical imaging, and microgravity surveys.[1]

At the request of a landowner, and with his or her signed permission, the AMLU staff may be able to inventory surface mine features on the property and may be able to provide an informal, qualified opinion that could include suggested options to close some mine openings. These inspections are subject to available staff and resources. However, the AMLU staff cannot and does not identify the extent of underground abandoned mine workings. In addition, if an abandoned mine is located on a neighboring property, the AMLU staff would not be able to inventory the site, unless the neighboring landowner provides written permission.

Places to begin a search for abandoned mine location data or to locate a claim

- U.S. Geological Survey (USGS) topographic maps identifying mine surface workings can be viewed online at MyTopo, where you can search by city, town, zip code, address, geographic feature, or by latitude and longitude.
- Your county recorder's or assessor's office may have information on mines within the county. Check to see if a mining claim was recorded or if bound volumes of mine patents, claims, or other records exist.
- Visit the Bureau of Land Management (BLM) Frequently Asked Questions on Locating a Mining Claim/Site at www.blm.gov/ca/caso/iac/faqmc.html, call the BLM's California State Office at **(916) 978-4400** and ask for the public room, or visit the GeoCommunicator website identified below.

---

[1] In his abstract "Overview of Geophysical Methods," University of Kansas geology professor Don Steeples states (see www.fhwa.dot.gov/engineering/geotech/hazards/mine/workshops/ktwkshp/kentucky.cfm):

"Locating underground mine workings in the absence of mine maps is not impossible, but it can be expensive and time consuming. Drilling enough vertical holes on a 3-foot grid will locate virtually any mine workings, but, in addition to the expense, it damages the Earth's surface and creates conduits for underground fluids, including pollutants that can degrade groundwater. Because of the time and expense associated with extensive drilling, remote sensing and geophysical methods have been employed to search for [abandoned mines].... While these methods have proved successful in some cases, drilling is still necessary to confirm interpretations of geophysical and remote sensing data. In addition, the absence of evidence of a mine is not evidence of absence of a mine, and there are many opportunities for error in the modeling and geophysical surveys needed to detect voids." (National Academy of Sciences, 2002.)

- The GeoCommunicator website, sponsored by the BLM and U.S. Forest Service (USFS), allows users to search, locate, and map mining claims, mineral leases, oil and gas leases, and rights-of-way on public lands in the United States.
- Research the Mineral Resources Data System (MRDS), maintained by the USGS, for information on mines, prospects, and mineral occurrences. This is a comprehensive dataset for mine names and commodities, but locations may not be very accurate, such as those based on *Public Land Survey System* section and lot numbers only.

For historical information on a named mine

- Visit the California Geological Survey (formerly Division of Mines and Geology) library at **801 K Street, 14th Floor, Sacramento** (see its website at www.conservation.ca.gov/CGS/information/publications/library/ for current hours and phone number). The library has several sources of information on the history and production of mines in California, including the following (other libraries may also carry these publications).
  - **The Report of the State Mineralogist** (published yearly from the 1880s to the 1950s). The reports are organized by county, then by commodity, then by mine name. Descriptions usually include basic location data, detailed geology, and information on the mine workings of some mines.
  - **California Division of Mines and Geology County Reports** (not all counties have published reports). The reports are organized by commodity, then by mine name, and usually include basic location information, detailed geology, and a description of the mine workings.
  - **California Division of Mines and Geology Mineral Bulletins**. Each bulletin is a collection of data on a specific commodity (e.g., gold, chromium, copper, etc.) and typically includes basic location information, local geology, and a description of the mine workings.
- Contact local historical societies to see if they maintain records of significant mines and mining activity in their areas.

TERMS	
Acid mine drainage (AMD)	Contaminated water from a mine or mine waste pile that contains sulfuric acid, mainly due to oxidation of pyrite.
Acid rock drainage (ARD)	A more general term for acid mine drainage that includes naturally-occurring acidic waters.
Adit	A horizontal passage or opening driven from the surface, generally for the purpose of exploring or opening a mineral deposit. An adit is open to the surface at one end; a tunnel is open at both ends.
Arrastre or Arrastra	A circular rock-lined basin in which broken ore is pulverized by stones attached to a pillar and dragged around the basin. The arrastre was in common use in the western and southwest United States in the 18th and 19th centuries.
Backfill	Soil, overburden, mine waste, or imported material used to replace material removed during mining. Also refers to the technique used to close an abandoned mine opening by filling with such material.
Border Zone Property	California's Hazardous Waste and Border Zone statutes were enacted in 1980 as Assembly Bill 2370, Chapter 1161 (effective January 1, 1981). California Health and Safety Code (H&SC) Section 25117.4 defines Border Zone Property as follows. Any property designated as border zone property pursuant to [H&SC] Section 25229 which is within 2,000 feet of a significant disposal of hazardous waste, and the wastes so located are a significant existing or potential hazard to present or future public health or safety on the land in question.
California Environmental Quality Act (CEQA) (Public Resources Code Sections 21000 *et seq.*).	The CEQA and its implementing guidelines (California Code of Regulations Sections 15000 *et seq.*) address the process of disclosure and review of environmental impacts. The AMLU does not remediate or provide remediation funds for abandoned mine closures unless the lead state, local, or federal agency has completed the required environmental review pursuant to the CEQA or National Environmental Policy Act (NEPA).
Collar	The surface opening to a shaft. Also refers to the timbering or concrete around the surface opening of a shaft.
Cribbing	Planks or small timbers placed along the sides of a shaft, winze, or raise to stabilize the interior walls and prevent rocks from falling.
Crosscut	A horizontal passage driven to intersect an ore deposit, or in general across the strike of the rock formation; a connection from a shaft to an ore deposit.
Crusher	A machine for crushing rock or other materials. See also stamp mill.

TERMS	
Cyanide	A salt or ester of hydrocyanic acid. In solution, cyanide is used to dissolve gold and silver from unwanted material for later recovery.
Decline	A downwardly-sloping passage. See also Incline.
Drift	A horizontal passage underground that runs the length (parallel) of a vein or rock formation as opposed to a crosscut, which crosses perpendicular to the rock formation.
Dump	A pile or heap of extracted rock on the surface.
Feature	A single human-made object or disturbance associated with mining, such as a shaft or adit, tailings, machinery and facilities, etc. A mine can be comprised of one or more features.
Gangue	The commercially worthless mineral material associated with economically valuable metallic minerals in an ore deposit.
Glory hole	A steep-sided, funnel-shaped surface excavation connected to underground workings. In glory-hole mining, rocks blasted off the sides of the excavation fall into the underground workings, from which they are then removed. Also referred to as a large open hole typically associated with a mined-out or widened shaft.
Hard-rock mining	A technique of mining used when mineralized rock occurs deep beneath the surface. To reach the ore body, remove ore and waste, and provide ventilation, miners excavated a shaft or adit. Within the ore deposit, horizontal passages called drifts (parallel to the vein or ore body) and crosscuts were developed on several levels to access stopes.
Hazardous Waste Property	California's Hazardous Waste and Border Zone statutes were enacted in 1980 as Assembly Bill 2370, Chapter 1161 (effective January 1, 1981). California H&SC Section 25117.3(a) defines Hazardous Waste Property as follows. Land which is either of the following: (1) Any hazardous waste facility or portion thereof, required to be permitted pursuant to this chapter, which has a permit for disposal from the department or has submitted an application for such a permit. (2) A portion of any land designated as a hazardous waste property pursuant to [H&SC] Section 25229 where a significant disposal of hazardous waste has occurred on, under, or into the land resulting in a significant existing or potential hazard to present or future public health or safety.

TERMS	
Headframe	The vertical steel or timber frame at the top of a shaft that supports the hoist system used to raise and lower workers and equipment and to remove ore from the shaft.
Heavy metal	Principally the metals zinc, copper, cobalt, and lead. May also include one or more of the following metals: bismuth, cadmium, chromium, gold, indium, iron, manganese, mercury, molybdenum, nickel, palladium, platinum, silver, thallium, tin, and vanadium.
Hoist	A drum on which wire cable is wound in the engine house, as the cage or skip is raised in the hoisting shaft. Also refers to the engine with a drum used for winding up a load from a shaft.
Hotline	The AMLU's toll-free telephone number (**877-OLD-MINE**) for reporting abandoned mines in California.
Incline	An upwardly-sloping passage. See also Decline.
Lagging	Planks or small timbers placed along the roof of a horizontal passage to prevent rocks from falling, rather than to support the main weight of the overlying rocks.
Leaching	The removal in solution of the more soluble minerals by percolating waters. Also refers to the process of extracting a soluble metallic compound from an ore by selectively dissolving it using a suitable solution (termed a "lixiviant"), such as water, sulfuric acid, hydrochloric acid, cyanide, etc.
Levels	Drifts at different elevations of a mine.
Mill	A mineral treatment plant in which crushing, grinding, and further processing of ore is conducted to produce a product.
Mine	All mineral bearing properties of whatever kind or character, whether underground, or in a quarry or pit, or any other source from which any mineral substance is or may be obtained (California Public Resources Code Section 2200). These resources include precious metals, precious stones, building stones, aggregate, and solid fuels. The location where the extraction of solid mineral resources from the earth takes place.
Mine waste	Solid waste from mining operations, including waste rock, tailings, and slag. "Mining waste" includes the residual of soil, rock, mineral, liquid, vegetation, equipment, machines, tools, or other materials or property directly resulting from, or displaced by, surface mining operations (California Public Resources Code Section 2730).
Mining district	An area containing multiple mines for a particular mineral commodity or commodities.

TERMS	
National Environmental Policy Act (NEPA) (42 U.S.C. 4371 *et seq.*)	Addresses the process of disclosure and review of environmental impacts. The AMLU does not remediate or provide remediation funds for abandoned mine closures unless the lead state, local, or federal agency has completed the required environmental review pursuant to the NEPA or the California Environmental Quality Act (CEQA).
National Historic Preservation Act (16 U.S.C. 470 *et seq.*)	Provides a process for registration of properties significant in national, state, and local history on the National Register of Historic Places. Ensures planning considerations and recognizes state historic preservation initiatives and laws.
Open-pit or open-cut mining	A surface mining technique where the barren rock material over the ore body normally requires drilling and blasting to break it up for removal. A typical mining cycle consists of drilling holes into the rock in a pattern, loading the holes with explosives or other blasting agents, and blasting the rock in order to break it into a size suitable for loading and hauling to the mill, concentrator, or treatment plant for processing.
Ore	A mineral deposit containing a metal or other valuable resource in economically viable concentrations.
Pit	A surface excavation of relatively large dimensions from which ore and waste have been extracted.
Placer	A surficial mineral deposit formed by mechanical concentration of mineral particles from weathered debris. This process usually involves water.
Placer mining	In placer mining no excavation is involved; instead, gravel, sand, or talus (rock debris) is removed from deposits by hand, hydraulic nozzles, or dredging.
Portal	The surface entrance to an adit or tunnel.
Public Land Survey System (PLSS)	The PLSS typically divides land into 6-mile-square townships. Townships are subdivided into 36 one-mile-square sections (each section contains approximately 640 acres). Sections can be further subdivided into quarter sections, quarter-quarter sections, or irregular government lots. Wooden stakes, posts, marked trees, pits, piles of rock, or other non-permanent markers often marked the original PLSS surveys. On March 3, 1853 (almost 2½ years after becoming a state on September 9, 1850), California received a grant of two sections of land, specifically the title to Sections 16 and 36, out of each Township held by the Federal government.

TERMS	
Raise	A vertical or inclined passage driven upward from a level (drift or crosscut) to connect with the level above, or to explore the surrounding rock for a limited distance. A raise does not daylight at the surface.
Shaft	A vertical or declined opening driven from the surface for the purpose of opening and servicing a mine. It is usually equipped with a hoist at the top, which lowers and raises a conveyance for handling miners and material.
Slag	Solid waste material from smelting activity, consisting mostly of silicate minerals and glass. Some slags contain elevated concentrations of heavy metals and metalloids in forms that are leachable.
Sluice box	A long, inclined trough for washing or separating ores.
Stamp mill	A historical apparatus powered by steam or water in which rocks were pounded to a fine powder by heavy iron pestles (stamps), generally grouped in units (batteries), that rose and fell like pile drivers. Amalgamation (collection with mercury) was usually combined with stamp milling to recover gold and silver from the crushed rock.
Stockpile	Broken ore accumulated in a pile on the surface before processing or shipment.
Stope	An excavation in a mine from which ore is extracted.
Sump	An excavation underground for the purpose of catching or storing water. The bottom of a shaft is commonly used for this purpose.
Surface Mining and Reclamation Act of 1975 (SMARA) (Public Resources Code Sections 2710 *et seq.*)	Requires new and existing mines to have an approved reclamation plan and financial assurances sufficient to cover the estimated cost of reclamation. The intent of the Legislature in passing the SMARA was to: ...Create and maintain an effective and comprehensive surface mining and reclamation policy with regulation of surface mining operations so as to assure that: (a) Adverse environmental effects are prevented or minimized and that mined lands are reclaimed to a usable condition which is readily adaptable for alternative land uses. (b) The production and conservation of minerals are encouraged, while giving consideration to values relating to recreation, watershed, wildlife, range and forage, and aesthetic enjoyment. (c) Residual hazards to the public health and safety are eliminated.

TERMS	
Tailings or Tailing pile	Processed material rejected from a mill after the desired minerals have been extracted.
Tailings pond	A pond with a constraining wall or dam into which mill effluents are run.
Tunnel	A horizontal underground passage that is open at both ends. This term is often incorrectly applied to an adit (which is open at only one end).
Vein	A definable linear zone of mineralized rock.
Waste rock	The barren rock from a mine. It also applies to the part of the ore deposit that is too low in grade to be of economic value at the time of mining.
Winze	A vertical or declined passage driven downward from a level (drift or crosscut) to connect with the level below, or to explore the surrounding rock for a limited distance. A winze does not daylight at the surface.